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HISTORY OF BOTANICAL EXPLORATION IN INDIA

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Masterly reviews on the history of Botanical exploration in India have been written by such stalwarts as King (1899), Agharkar (1938), Biswas (1943), Santapau (1956) and Burkill (1965). However, it was felt that after the reorganisation of the Botanical Survey of India in 1954, it was worthwhile once again to briefly review on this subject. Early Hindu treatises like *Āyurveda, Charaka Samhitā* and *Susruta* deal with plants mainly in relation to medicine, agriculture and horticulture. It is said that 2500 years ago, Bhiksu Ātreya, a professor of the University of Taxila, asked his pupil Jivaka to collect, identify and describe the properties of all the plants, growing within a distance of four *yojanas* from the university. It must be also mentioned here that Dhanvantri and Nāgarjuna were other well-known persons with an intimate knowledge of the characters of medicinal plants. A plant which has gained world-wide popularity during the past 25 years is *Rauvolfia serpentina* (L.) Benth. ex Kurz, (Apocynaceae) and it is remarkable that this taxon is mentioned in ancient manuscripts and also in the monumental work of Charaka; the plant is described under its Sanskrit name of *Sarpagandha* which is useful as an antidote for snake bites and insect stings. Since it has curative effects in cases of insanity, it has long been known in Hindi as *pagal-ki-dawa*. Its great importance as a drug has been realised during recent years in western medical therapy. The earliest explorations during modern times were made by the Portugese and Dutch. During the beginning of the 16th century, the botanical work of the Portugese Garcia d'Orta in Goa included the establishment of a botanical garden for the study of native drugs and their uses, finally leading to the publication of his *"Os Coloquis"* in 1565. During this period there was also exchange of scientific information with counter parts in Europe. Garcia d'Orta's work was followed by the most significant publication of the Dutch botanist in the 17th century "Hortus Malabaricus" by Heinrich van Rheede.

During the wake of the struggle among the European nations first for trade and then for political supremacy, the zealous efforts of many European naturalists, army and medical officials and botanists, who visited India during the 17th, 18th and 19th centuries and undertaking explorations in the different parts of the country resulted in a knowledge of the flora of India. In the 18th century, mention must be made of the distinguished botanist Johan Gerhard Koenig, a pupil of Carl Linnaeus, who introduced the binomial system of nomenclature. He came to the Danish settlement at Tranquebar (100 km from Madras) in 1768 and started with much zest, like his great teacher Linnaeus, to impart botanical knowledge in southern India. He threw himself with great energy into a study of the flora of the Madras coast which earlier had been sampled by Sam Browne and Burkley. Koenig sent dried specimens of plants to Linnaeus and Retzius and they published lists of these plants to show the characteristic flora of the coastal plain of Coromandel. The work of the other botanists like Heyne, Klein and Rottler may also be mentioned here.

After the establishment of the Indian Botanic Garden by Robert Kyd in 1787, William Roxburgh, an army surgeon, aptly called the 'Father of Botany' in India published the following monumental works : Plants of the Coromandel coast (1795-1819), Hortus Bengalensis (1814), Flora Indica (1820-1824, 1832). He was also responsible for the preparation of the magnificient Icones consisting of drawings of about 2533 taxa indigenous to India, some of which constitute types. It is said that while Kyd was responsible for the horticultural aspect of the garden, Roxburgh's name in great measure is associated with the foundation and early development of taxonomic botany. Further, Roxburgh is known to have contrived to get orchids in good state to London where they were established in hot house conditions and made to flower during 1813. When he was sent to Samalkot on regimental duty, he explored and finding wild pepper he established an experimental plantation where a trial was made of pepper and cardamoms, sappan wood, indigo and other possible crops. At the same time he studied the wild plants and accumulated a large collection of drawings of them. Roxburgh's collecting extended from the coast back up to the hills, to an altitude of about 666 m. He was also responsible for establishing Jute in the Botanic Garden at Sibpore and for exporting the first one thousand tonnes of this crop to the European market. Buchanan-Hamilton succeeded Roxburgh for a short time. He was a naturalist of great reputation and during his period he travelled in Nepal, Mysore and the Burmese kingdom of Ava. He collected a large number of plants which he presented to the University of Edinburgh.

During the first half of the 19th century, the contributions of Wallich, Griffith, Royle, Wight, Edgeworth, T. Thomson and others are important. Nathaniel Wallich, who succeeded Buchanan-Hamilton in 1817 organised expeditions into the remote and then little known regions of Kumaon, Nepal, Sylhet, Tenasserim, Penang and Singapore; actually, he took a botanical survey of a major part of the Indian subcontinent and made extensive collections and all these were distributed among the herbaria of Europe. An important contribution of his is *Plantae Asiaticae Rariores* (1829-1832) brought out in 3 splendid volumes where coloured figures of high degree of excellence are presented. His name is also associated with the famous Numerical List of Plants generally known as Wallich catalogue' ("Wall. Cat.").

Next, during the long absence of Wallich in Europe, William Griffith (1842-1844) officiated. He started his career by conducting botanical explorations in Tenasserim, South Burma and his expeditions extended up to the Assam valley where he explored Mishmi, Khasia and Naga Hills. He also botanised in the Himalayas, particularly in Simla Hills and up to the Narmada valley in Central India. 'Griffith was a man of genius' and he took particular interest in enhancing the condition of the herbarium and his extensive notes and drawings were published in nine volumes posthumously. The names of Wallich and Griffith are associated with the finding of wild bushes of Tea, which they spotted in Upper Assam. Royle's illustrations of the Botany of Himalaya were a significant contribution.

The visit of Joseph Dalton Hooker in 1849 and his travels in eastern India, particularly in Sikkim Himalaya exercised great influence on the further botanical work in India. Joseph Dalton Hooker with Thomas Thomson made extensive and thorough collections in

Eastern Himalaya particularly Sikkim. Later, both were also responsible for energetic collection in the Khasi hills of Assam. They not only collected species for drying but also interesting exhibits for an economic museum at Kew which Sir William Hooker had commenced in 1847, consisting of timbers, bamboos, dry fruits, gums, resins and other interesting plant materials. J. D. Hooker's (assisted by botanists) *Magnum opus* was the Flora of British India (1872-1897). The Indian Forest Department was organised under the distinguished leadership of Dietrich Brandis.

Michael Pakenham Edgeworth (1812-1851), when stationed in Ambala on administrative service made botanical explorations into the Himalaya where he collected a number of plants. Soon he focussed his attention on the relations of crops to soils and then extended his observations on the relation of wild plants to the same soil; he published these results in the Journal of the Asiatic Society of Bengal in 1839 and this paper may be regarded as the first ecological paper published in India. He also collected plants and in addition explored the hills west of Simla like Mandi and Kangra and also Kulu and Chamba. He was one of the eminent botanists enlisted by Hooker for the preparation of the Flora of British India.

During 1855 Thomas Thomson joined office in the Botanic Garden. He was a traveller and botanist of much ability. He is well-known as the co-adjutor of Joseph Hooker in the collection and distribution of an extensive herbarium of East Indian plants; in addition, he is the joint author of the first volume of a new *Flora indica* published in 1855. Thomson who retired in 1861 was succeeded by Thomas Anderson and he was mainly responsible for the introduction of *Cinchona* in the Darjeeling and Sikkim-Himalaya. Next after Anderson's departure from India in 1869, for two years (1869-1871) C. B. Clarke, a well-known botanist acted as the superintendent of the garden. He began a series of publications on his vast collections of plants. Further, he was one of the distinguished collaborators in Hooker *et al.*, Flora of British India. He made collection journeys in Nilghiris, Sikkim, Khasi Hills, Kangra and Chamba and lastly Kashmir. Clarke, during heavy rain in September 1875 took an opportunity of visiting the mountain of Tonghu in Sikkim from the south by a new bridle path which Hooker had visited from the eastern side during May 1848 in incessant rain. When he was walking along the bridle path, he observed a number of flowers facing downwards so that their pollen was not damaged by the rain. Such interesting field observations have significant evolutionary significance.

In the meanwhile, the establishment of the Botanical Survey of India under George King in 1890 as the first Director at Howrah, and centres for botanical work at Saharanpur, Bombay and Madras along with the contributions of Barber, Clarke, Cooke, Duthie, Gamble, Lawson and others marked the highlights during the closing of the 19th century. King was responsible for initiating the publication of the *Annals of the Royal Botanic Garden* and also had the unique distinction of contributing a number of important papers and monographs to the journal. Another important achievement was the completion of the seven volumes of the monumental *Flora of British India* under the general editorship of the great Hooker at Kew.

King was succeeded by David Prain in 1897, a Surgeon-Major. He gained world-wide reputation for his studies on the genera *Pedicularis* and *Dioscorea* and the regional Flora entitled *Bengal Plants.* After his retirement in 1906, A.D. Gage succeeded him and continued in office for a long period of

17 years. He is reputed for his remarkable studies on Euphorbiaceae and the Burmese Flora. C. C. Calder succeeded him in 1923. He is well-known for his outstanding studies on *Oxalis* and vegetation patterns of India. Lastly, K. Biswas and D. Chatterjee were important Indian taxonomists well-known for their contributions on the systematics, taxonomy and phytogeography of India.

The exploratory phase and the floristic investigations carried out by the British personnel, medical and forest officers resulted in the publication of several excellent regional floras by Cooke (1901-1908), Duthie (1903-1922), Gamble (completed by Fischer, 1915-1936), Haines (1921-1925) and Kanjilal, Kanjilal and Das (1934-1940) during the early part of the 20th century; in this connection mention should be made of other important publications in the series like the Annals of the Royal Botanic Garden and the Records of the Botanical Survey of India.

The early part of the 20th century, however, marked the decline of botanical activity in the various regional departments and the virtual abolition of the Botanical Survey of India in 1937; there was a time of a temporary lull and decline in interest for taxonomic studies and exploration work. However, botanical work in other branches were initiated in the University Departments and facilities were created for study and research in such disciplines like morphology, anatomy and embryology, cytology, physiology, genetics and other allied branches.

Fortunately, after the reorganisation of the Botanical Survey of India in 1954 and incorporation in it later of the Calcutta herbarium (now called the Central National Herbarium) and the Indian Botanic Garden, as also the establishment of the regional circles and herbaria have now opened opportunities for floristic and taxonomic studies in the country. The future is challenging and there is fruitful opportunity for young enthusiastic botanists to venture out in the field, thus promoting the importance and usefulness of botanical explorations to mankind.

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REFERENCES

AGHARKAR, S. P. Progress of Botany during the past twenty-five years. In B. Prasad's *Progress of Science in India,* 742-767. Calcutta. 1939.

BISWAS, K. Systematic and taxonomic studies on the flora of India and Burma. *Proc. 30th Indian Sci. Congr. assoc., Calcutta,* 101-152. 1943.

BURKILL, I. H. Chapters on the History of Botany in India. Calcutta. 1965.

KING, G. The Early history of Indian Botany, *Rep. Brit assoc. Adv. Sci.* (Dover) 1899 : 904-919. 1899.

SANTAPAU, H. The Botanical Exploration of India. *J. Indian bot. Soc.* 35 : 1-6. 1956.